

GOOD SHEPHERD EPISCOPAL SCHOOL

7th Grade Science Year at a Glance

Unit: Introduction to Science

Standards

- Identify the base units for distance, mass, and volume in the metric system.
- Convert between the standard metric prefixes.
- Estimate distances, masses, and volumes of everyday objects.
- Plan an investigation and in the design, identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded and how many data are needed to support the claim.

Skills

- Conduct a lab using all appropriate lab safety measures.
- Converting and estimating within the metric system.

Unit: Population Dynamics

Standards

- Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

Skills

- Analyzing and interpreting data.
- Constructing explanations and designing solutions.

Projects

- Population Interactions Model Poster (compare and contrast members of the same ecological role from different ecosystems)

Unit: Biochemical Processes

Standards

- Construct a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.

Skills

- Constructing explanations.
- Developing and using models.
- Understand that within a natural system, the transfer of energy drives the motion and/or cycling of matter.

Projects

- Labs studying Elodea, yeast, and our own respiration and heart rates in response to exercise

Unit: Thermal Energy

Standards

- Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
- Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
- Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
- Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.*

Skills

- Developing and using models.
- Engaging in argument from evidence.
- Analyzing and interpreting data.
- Constructing explanations and designing solutions.

Projects

- Conduction, Convection, and Radiation Lab Work
- Penguin Nesting House Design Project

Unit: Properties of Waves

Standards

- Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
- Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

Skills

- Use mathematical representations to describe and/or support scientific conclusions and design solutions.
- Developing and using models.
- Use graphs and charts to identify patterns in data.

Unit: Biochemical Processes

Standards

- Construct a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.

Skills

- Constructing explanations.
- Developing and using models.
- Understand that within a natural system, the transfer of energy drives the motion and/or cycling of matter.

Projects

- Labs studying Elodea, yeast, and our own respiration and heart rates in response to exercise

Unit: Cells

Standards

- Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
- Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Skills

- Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation.
- Develop and use a model to describe phenomena.
- Understand that phenomena that can be observed at one scale may not be observable at another scale.

Projects

- Microscope Work: Identifying the Stages of Mitosis

Unit: Cycles of Matter

Standards

- Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
- Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

Skills

- Develop and use a model to describe phenomena.
- Develop a model to describe unobservable mechanisms.
- Analyzing and interpreting data.

Projects

- Carbon Cycle Children's Book Project

Unit: Reproduction

Standards

- Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- Describe the reproductive system of humans along with the functions for each major part.

Skills

- Interpreting diagrams and analyzing data.

Genetics and Evolution are units that are covered in time allows in the year. We move at a pace driven by student need and interest.

Unit: Genetics

Standards

- Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- Develop and use a model to describe why structural changes to genes located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
- Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

Skills

- Develop and use a model to describe phenomena.

Unit: Evolution

Standards

- Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
- Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
- Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
- Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
- Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.

END OF YEAR PROJECTS - For our final assessment at the end of the year, students choose several different standards from the year to demonstrate in a method they choose. This has included scrapbooks, video presentations, Minecraft museums, and many more.

This YAG will change. It is meant only to provide a quick look at the topics that will be addressed during the school year. Class progress, ERB testing, school trips, and inclement weather will all merit YAG adjustments.